

# LOUISIANA WILDLIFE INSIDER



*Spring/Summer 2009* .....

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## WILDLIFE DIVISION OVERVIEW

The Louisiana Department of Wildlife and Fisheries' (LDWF) strategic plan states that "the purpose of the Office of Wildlife Program is to provide wise stewardship of the state's wildlife and habitats, to maintain biodiversity, including plant and animal species of special concern, and to provide outdoor opportunities and education for present and future generations to engender a greater appreciation of the natural environment." The Office of Wildlife is comprised of two divisions, Coastal and Non-game Resources Division (formerly Fur and Refuge) and Wildlife Division. As the name implies, the Coastal and Non-game Resources Division is largely oriented toward coastal resources, the exception being its role in non-game management. The Wildlife Division has statewide responsibilities, but its Public Lands Program is predominantly outside of the coastal zone. Given such a broad mission, it is logical that a wide range of research and management work is conducted in order to maintain healthy, productive populations of wildlife and provide recreational opportunities for citizens to enjoy these species. Staff biologists gather data on birds and animals for use in formulating harvest regulations and development of habitat management recommendations. They develop workshops for LDWF and other agencies' personnel and present seminars to the public. In addition, the staff represents LDWF on state, regional and national committees, providing wildlife input to a wide array of public agencies, non-governmental organizations and private industry. Wildlife Division's species programs are White-tailed Deer, Upland Game, Wild Turkey, Waterfowl, Large Carnivore, Nuisance Wildlife and Wildlife Disease. This first newsletter focuses on aspects of these programs.





## UPDATE: LOUISIANA BLACK BEAR RESEARCH PROJECT

**By Jared Laufenberg, Graduate Research Assistant, University of Tennessee and Joseph Clark, Principal Investigator, USGS, University of Tennessee**

The Louisiana black bear (*Ursus americanus luteolus*) once occurred throughout Louisiana, in southern Mississippi and in eastern Texas. Today, habitat in the Mississippi Alluvial Plain is highly fragmented due to land clearing for agriculture; more than 80 percent of the bottomland hardwood habitat has been lost. As a consequence, the remaining bears in the region primarily exist in isolated fragments of wooded habitat in the Tensas River and Atchafalaya River basins (Figure 1). In 1992, the U.S. Fish

and Wildlife Service (USFWS) granted the Louisiana black bear threatened status under the U.S. Endangered Species Act, listing loss of habitat as a primary threat. A recovery plan was developed in 1995 that provided criteria for delisting:

1. at least two viable subpopulations, one each in the Tensas River and Atchafalaya River basins;
2. establishment of immigration and emigration corridors between the two viable subpopulations; and
3. long-term protection of the habitat and interconnecting corridors that support each of the two viable subpopulations used as justification for delisting.

The plan defines a viable subpopulation as one which has a 95 percent or better chance of persistence over 100 years, despite random effects of demography, environment, genetics and natural catastrophes. Long-term protection is defined as having sufficient voluntary conservation agreements with private landowners and public land managers in the Tensas River and Atchafalaya River basins so that habitat degradation is unlikely to occur over 100 years.

Since the plan was published, a number of studies on Louisiana black bears have been conducted. Research has focused on movement patterns, habitat needs, taxonomy, denning ecology, public attitudes and survival. That work has greatly added to our knowledge on the status of the Louisiana black bear. Along with research, a number of management activities have improved recovery prospects for the Louisiana black bear. Since listing in 1992, approximately 320,000 acres of future bear habitat have been created under the federal Conservation Reserve Program, and another 225,000 acres have been created under the federal Wetland Reserve Program. The Louisiana Department of Wildlife and Fisheries (LDWF) also acquired over 30,000 acres along the Mississippi River and Tensas River basins for inclusion in the wildlife management area (WMA) system during the past 25 years.

A reintroduction program started in 2001 to reestablish a black bear subpopulation in the Red River Complex (RRC), which includes Red River and Three Rivers WMAs (Figure 1.). The primary objective of this program is to reintroduce bears to suitable habitat, thereby increasing overall numbers and strengthening the network of bear subpopulations in the region. However, because black bears have a remarkable ability for homing, post-translocation movements can be extensive and often result in mortality. Employing a translocation method that minimizes these movements is essential to the success of the reintroduction program. Therefore, a “soft release” method of reintroduction is currently being used. This method of release involves capturing and translocating hibernating females with cubs and takes advantage of a female’s maternal instincts that can override homing behavior, thus reducing post-release movements and increasing reintroduction success. Live trapping has been conducted to radiocollar adult females on the Tensas River Basin (TRB) study area, which includes the Tensas River National Wildlife Refuge, Big Lake and Buckhorn WMAs and adjacent private properties.



Radio-collared females are located during the winter den season to determine reproductive status, litter size and capture potential for reintroduction. Family groups that are suitable candidates for translocation are removed from their dens in mid-March and relocated to artificial den boxes located within the RRC. Currently, there are 27 and 25 radio-collared females on TRB and RRC study areas, respectively. These collared animals are also monitored monthly during spring, summer and fall to determine survival. Females with cubs are located intermittently during spring, summer and fall to determine cub survival. Since the reintroduction program's inception, 44 adult females with 96 cubs have been translocated to the RRC. Since 2005, researchers have documented 14 litters produced by 11 translocated females post-release, totaling 38 cubs born in the RRC. This year will mark the ninth and final year of the reintroduction program.

The University of Tennessee/US Geological Survey has conducted research on Louisiana black bears for the past three years to develop an integrated program to determine whether the recovery criteria set forth in the 1995 Louisiana Black Bear Recovery Plan have been met. This year,

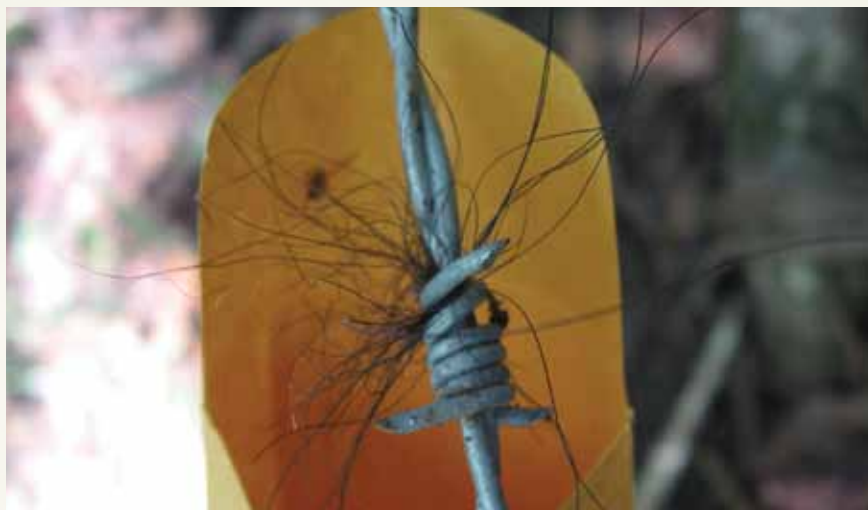
research continues to focus on estimating abundance, density and growth rates for TRB and Upper Atchafalaya River Basin (UARB) (Pointe Coupee Parish) subpopulations by collecting DNA samples, reintroducing bears from TRB to suitable habitat within RRC and monitoring adult female and cub survival, reproduction and recruitment for TRB and RRC subpopulations.

Hair samples have been collected from TRB and UARB subpopulations since 2006 and 2007, respectively, for DNA-based abundance, density and growth rate estimation. This technique utilizes DNA contained within hair follicles to obtain a genetic identity of individual bears within a study area. Hair samples are collected from baited sites surrounded by barbed wire each week for eight to 10 consecutive weeks during the summer. Those samples are then sent to a genetics lab for DNA analysis. This method of capture functions like a typical mark-recapture study in that a bear's genetic "fingerprint" left at a hair site is treated as an initial capture; subsequent samples left at sites later during the sampling process are treated as recaptures, and a history of capture is built for each individual.

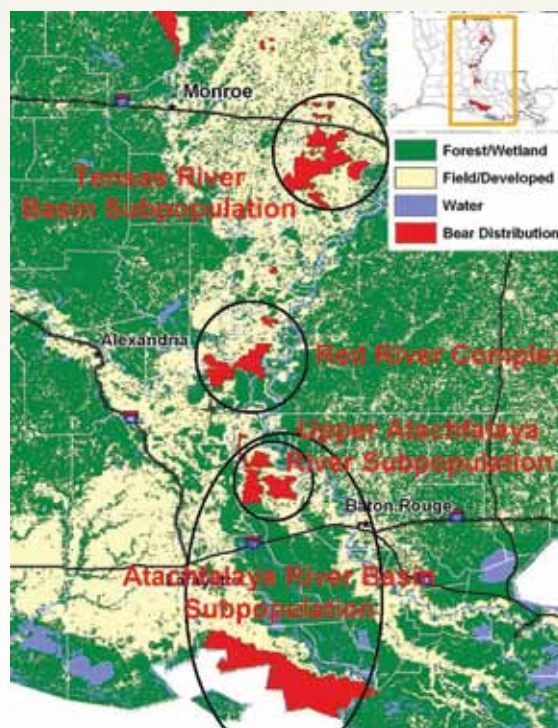
During summer 2008, over 2,252 hair samples were collected from 192 different hair sites on TRB study area. Sampling was conducted from June 9 - Aug. 2 for eight consecutive weeks.

Laboratory analysis is currently underway for hair samples collected from both study area for all years of collection, and sample collection will resume this coming summer on both study areas. Results for TRB and UARB are expected to be available summer 2009 and summer 2010, respectively. After results are obtained, population projections for these subpopulations will be made using a combination of population factors obtained from DNA and radio telemetry sampling.

The cooperative support between LDWF, USFWS, Black Bear Conservation Committee, other non-governmental organizations, University of Tennessee, Louisiana State University and numerous private landowners has been essential to recovery efforts of the Louisiana black bear. Continued support and comprehensive research assessing the status of black bears in Louisiana will be needed to thoroughly address the recovery criteria set forth in the plan.



*Black bear hair on barbed wire set.*



*Figure 1.*



# 2008 WILD TURKEY HATCH

*By Larry Savage, Turkey Study Leader*

The hatch is a general characterization of the outcome of the wild turkey's annual nesting cycle. Of course, the number of hatchlings that actually exit the egg is just the beginning of the story. Like LSU football, recruitment is the name of the game. Recruitment is the number of young turkeys surviving each year to join the fall population and is the key factor determining wild turkey abundance. Mother Nature plays a significant role throughout this cycle, ultimately determining how many poults will survive long enough to scratch for acorns in the fall.

A complex combination of environmental variables and habitat quality factors can impact the hatch. The importance of each variable and how it interacts to influence fall recruitment is still not well understood. Rainfall is one of the best understood environmental factors. Generally speaking, above average rainfall during May adversely affects nesting success and early brood survival, and moderately dry conditions are beneficial. The fall recruitment rate, however, can still be chronically low even with perfect environmental conditions if proper nesting and brood rearing habitats are not available. Unfortunately, habitat quality, which is a very important factor, is difficult to measure.

An LSU graduate student is currently studying one of the most vexing of these relationships--how is nest predation in-

fluenced by the quality of nesting habitat. The first phase of an eight-year turkey ecology study on Sherburne Wildlife Management Area (WMA) has identified a shortage of good nesting cover, which results in high predation by raccoons, as the primary factor limiting nesting success. Currently, researchers are simultaneously radio-tracking nesting hens and foraging raccoons to determine how the food searching behavior of raccoons is influenced by habitat structure. This research could lead to refinements in habitat management techniques for turkey nesting habitat that minimize the opportunity for raccoons to locate turkey nests.

During a typical nesting season, weather, flooding and predators limit turkey nest success to less than 50 percent. Among successful nests, less than 25 percent of the poults are still alive after two weeks. The average life expectancy of an eastern wild turkey is estimated to be about 1.5 years. With odds against the long-term survival of each individual turkey, the population is largely composed of birds recruited during the last three nesting seasons. As a result, it is normal for turkey numbers to cycle up and down depending on the success of the three prior years' hatches.

The hatch starts with a nest that contains, on average, 10-12 eggs laid during the first and second week in April. There is a common perception among some Louisiana hunters that turkeys nest (and gobble) earlier in the southern half of the state. However, research over the last 15

*Good  
turkey  
nesting  
habitat.*

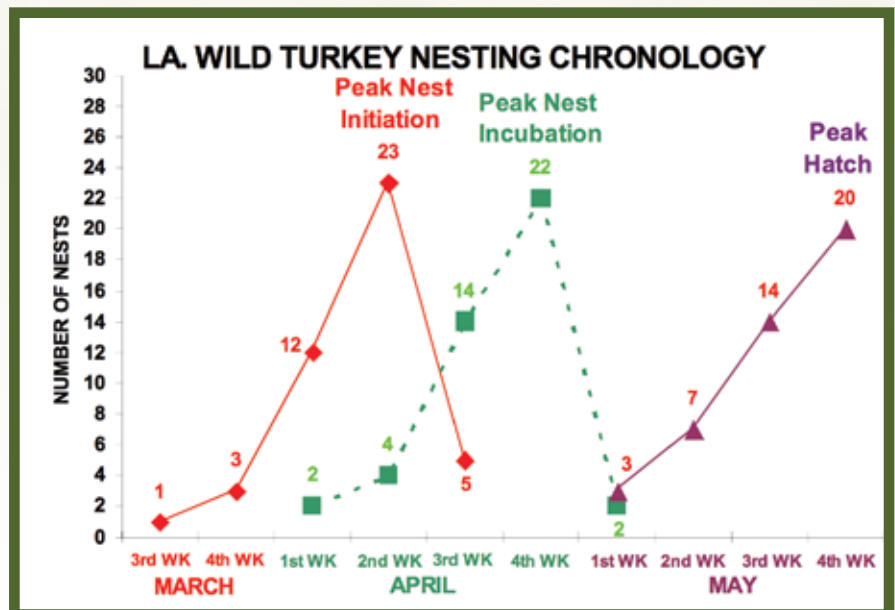


Figure 1.



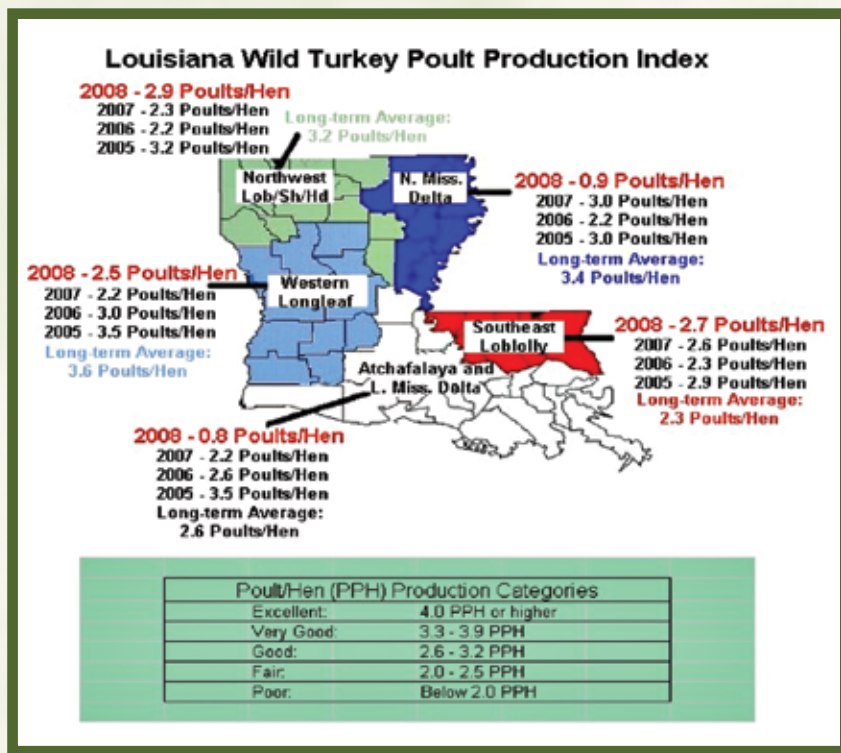


Figure 2.

years has shown that this is not the case. Nesting dates collected statewide, from Rum Center in Union Parish to the Atchafalaya Swamp in Iberville Parish, show that hens are basically on the same reproductive schedule, as is gobbling activity (Figure 1). The average date hens started incubation on 44 Louisiana turkey nests was April 19. This is in very close agreement with nesting dates from other southeastern states at the same latitude.

A large-scale study of the breeding time-table for the eastern wild turkey looked at all available nesting data and determined that latitude was the best predictor of turkey nesting dates. Photoperiod, or length of daylight, is the “clock” that turkeys at the same latitude are following. As days get longer in the spring, the change in photoperiod is the “cue” for initiation of breeding activity, including gobbling, mating and nesting.

The average hatch date in Louisiana is the fourth week in May. The Louisiana Department of Wildlife and Fisheries (LDWF) has conducted a Summer Turkey Survey since 1994 to monitor the hatch (poult recruitment). LDWF personnel and a select group of Louisiana Department of Agriculture and Forestry, U.S. Forest Service, U.S. Fish and Wildlife Service, forest industry staff and volunteers record all turkey sightings made from mid-June through August. Observations are divided into five habitat regions. Each of these regions contains a specific combination of habitat types, environmental conditions, land uses and human

population levels that uniquely impact turkey survival. The average number of poults seen per hen (PPH) provides an annual index of poult recruitment. PPH has been below average the last three years for all of Louisiana’s five turkey habitat units except the southeast loblolly (Figure 2).

The southeast loblolly habitat region of the Florida Parishes has had the lowest average poult production during the last 15 years. At one time, this region supported one of Louisiana’s “original” turkey flocks and was home to 68 percent of Louisiana’s turkey hunters. However, turkey numbers have declined since the late 1980s due to habitat deterioration associated with residential development and intensive forest management. The irreversible loss of habitat quality that plagues this region has intensified in the aftermath of Hurricane Katrina. Poult production and population numbers continue to suffer in Washington and St. Tammany parishes. However, good hatches in East and West Feliciana and Livingston parishes have boosted the region-wide PPH to above-average levels for three out of the last four years.

The piney woods habitat of north central and northwestern Louisiana produced a good hatch (2.9 PPH) in 2008. However, fair hatches in 2006 and 2007 resulted in declining turkey numbers across this region, particularly in areas of marginal habitat. Habitat quality has suffered due to the loss of plant species diversity and habitat fragmentation associated with in-

tensive pine forestry. Areas of high quality habitat that are associated with major stream bottoms continue to support stable turkey populations. The recruitment of an increased number of jakes in 2008 will produce improved hunting quality as these 2-year-old birds enter the 2010 season.

The historical longleaf pine region of southwest Louisiana has had the state’s highest average poult production index during the last 15 years. However, it has produced only one good hatch in the last three years, 2006 (3.0 PPH). Fair hatches in 2007 and 2008 will sustain the population in better habitats, but will not provide the surplus gobblers that hunters in this region have come to expect. Local areas of marginal habitat will probably experience a noticeable decline in turkey numbers.

Poult production numbers for the Mississippi River and Atchafalaya River habitats in 2008 were the lowest recorded (0.9 PPH and 0.8 PPH). Untimely spring flooding in the unprotected areas dealt a severe blow to poult production. In addition, heavy rainfall during the peak hatch period in May 2008 probably reduced poult survival in some areas. The impact of excessive hurricane induced rainfall in August and September is unclear. Poult production in the protected areas like Tensas National Wildlife Refuge and Big Lake WMA seemed to be normal.

Louisiana PPH records illustrate a gradual downward trend in turkey production in all five habitat regions during the past 15 years. However, Louisiana is not alone in declining poult production trends. Reproduction has been below average in most of Arkansas since 2002, with 2005 having their lowest PPH. In Mississippi, PPH was below average the last five years. South Carolina and Georgia also had below average PPH for the last five years. Both states recorded their lowest PPH on record in 2007, probably due to extreme summer drought conditions.

The current downward trend in poult production in some habitat regions of Louisiana may be attributed to one or a combination of all three of the following conditions:

1. **Short-term population declines due to the influence of adverse environmental factors on poult recruitment.** In this situation, local turkey populations decline temporarily due to poor poult production, but then rapidly rebound to normal levels when environmental conditions conducive to poult survival return. An example of this is the rock-bottom poult production caused by [continued on 22]





# GRASSLAND RESTORATION WHAT CAN BE DONE?

*By Fred Kimmel, Upland Game Study Leader*

Thirty years ago, bobwhite quail were still a popular game bird in Louisiana. Things have changed dramatically since then. Fire ants and coyotes are the most commonly heard explanations for the bobwhite's long-term decline. However, even if we were able to miraculously remove every coyote and fire ant from Louisiana, we still wouldn't have many bobwhite quail. The real problem is simple - they just don't have anywhere to live. Lack of suitable grassland habitat is the primary reason bobwhite quail populations have declined by about 85 percent since 1962. Bobwhites are not the only bird with this problem. In fact, the fastest declining species of birds are those that require grassland habitat, like bobwhites.

It is pretty easy to recognize the problems bobwhites face in agricultural landscapes. Clean ditch banks, closely mowed roadsides and lack of brushy

fencerows are characteristics that make many modern farms inhospitable to bobwhites. In forested landscapes, it is a little more difficult for the average person to recognize the reasons bobwhites have become scarce. One of the key factors is the lack of prescribed burning. Prescribed burning is burning under controlled conditions to achieve a particular result and was once much more common than it is today. Prescribed burning is essential for maintaining the grassland habitat that bobwhites require in pine forests.

The Louisiana Department of Wildlife and Fisheries (LDWF) and its partners have developed a couple of new projects to address some of the issues that have led to the decline in bobwhites and other grassland birds. Neither of these projects by themselves will reverse the trend of the last few decades, but they represent parts of the solution that will take time and persistence - two characteristics of nearly all successful conservation efforts.

## Acadiana Grassland Restoration Initiative (AGRI)

In many parts of the southeastern United States, native grassland vegetation has been planted and managed for field borders, filter strips, grazing and general conservation plantings. Diverse plantings of native grassland vegetation are beneficial to wildlife because they provide food and structure. Structure is an often overlooked, but important component of wildlife cover. Cover with the proper structure allows birds to move about and feed effectively, yet provides protection from predators. In addition to the wildlife benefits, native grassland vegetation can be very effective at reducing erosion, is drought tolerant and can produce excellent forage for livestock. Despite these benefits, native grassland vegetation has not been widely used in Louisiana.

AGRI is a partnership between LDWF, Acadiana Resource Conservation and Development Council (RC&D) and the Atchafalaya Region Chapter of Quail Forever. It is an effort to "jump-start" grassland restoration efforts in south central and southwest Louisiana. Targeted grasslands include agricultural field borders, native prairie restoration, native grassland habitat for wildlife and native grasses for grazing.

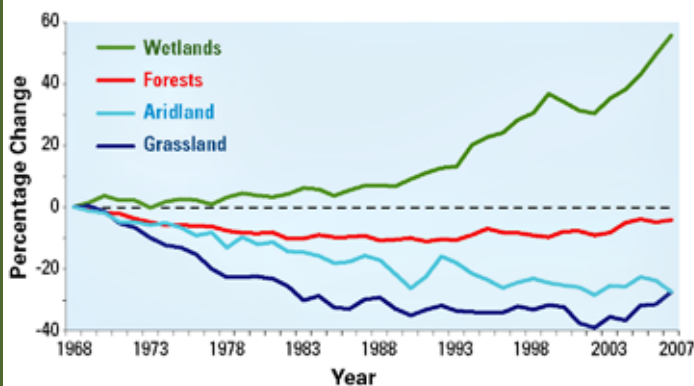
The project partners have identified three primary obstacles facing grassland restoration efforts in Louisiana and developed approaches to address these obstacles.

One obstacle is the lack of familiarity with native grassland establishment and management by natural resource professionals in Louisiana. Human nature dictates that most people will stick with what is familiar. Biologists, extension agents and district conservationists are unlikely to recommend or promote a practice about which they are uncertain. To address this, Acadiana RC&D will be providing comprehensive training to





## Bird Population Indicators



natural resource professionals regarding the benefits of native grassland and its establishment and management.

Another related obstacle is lack of familiarity with native grasslands by producers and landowners. Like natural resource professionals, landowners and producers are unlikely to install practices they have not seen or do not fully understand. The AGRI partners and co-operating landowners are establishing demonstration areas on two working farms (Acadia and St. Landry parishes) to showcase various conservation practices. The demonstration farms will provide real-world local experience with grassland establishment and management for the landowners and natural resource professionals assisting them.

The third obstacle to grassland establishment in Louisiana is the lack of experienced contractors (especially in south Louisiana) to assist landowners in establishing native grassland vegetation. Native grassland establishment differs from establishment of traditional crops, and some landowners or producers who are interested in the practice become discouraged when they find that there are few sources of assistance. To alleviate this problem, Acadiana RC&D will provide a variety of grassland establishment and management services to landowners in south-central and southwest Louisiana.

For more information contact LDWF (225-765-2355) or Acadiana RC&D (337-896-0288 ext. 3).

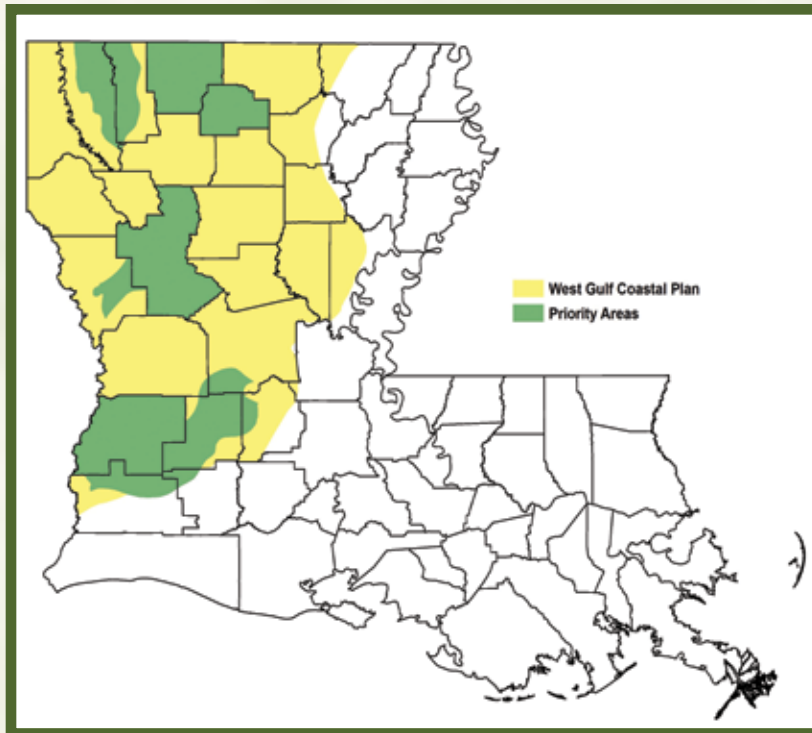
### West Gulf Coastal Plain Prescribed Burning Initiative

Prescribed burning is an essential component of management for bobwhites and other grassland birds in pine-dominated forests. Prescribed burning helps control woody encroachment and encourages growth of grassland vegetation, especially when coupled with forest

management practices such as thinning that allow sunlight to reach the ground. Prescribed burning was once routine in many areas of the state; however, in recent years, its application has declined. In an effort to increase the amount of prescribed burning and familiarize landowners with its benefits, the West Gulf Coastal Plain Prescribed Burning Initiative was formed. LDWF, Louisiana Department of Agriculture and Forestry's Office of Forestry and U.S. Fish and Wildlife Service (USFWS) are partners in this effort.

Landowners within the West Gulf Coastal Plain of Louisiana who are accepted into the program are eligible to have one prescribed burn conducted on their land at no cost. Landowners must apply to be considered for the program, and applications will be ranked by location, forest composition, forest structure, tract size and proximity to other land that is regularly burned. Certain areas of the state have been identified as priority areas, and land within or bordering these priority areas has the best chance of being accepted.

Once a tract is accepted, a management plan will be developed by LDWF or USFWS biologists. Office of Forestry personnel will install fire brakes and conduct the burn. A single prescribed burn will not yield long-term benefits, so follow-up burns will be needed. Landowners are responsible for follow-up burns, but LDWF and USFWS biologists will assist landowners in applying for programs that may provide financial assistance for future burns.



Interested landowners should contact LDWF or USFWS private land biologists for information or application materials. Once an application is submitted, the landowner will be contacted by a biologist who will arrange a visit to the property to complete the ranking form and gather information for a management plan. Contact one of the LDWF or USFWS offices below for more information.

### Louisiana Department of Wildlife and Fisheries

Alexandria	318-487-5885
Minden	318-371-3050
Monroe	318-343-4045
Ferriday	318-757-4571
Lake Charles	337-491-2575

### U.S. Fish and Wildlife Service

Tensas NWR	318-574-2664
Lafayette	337-291-3100
Bayou Cocodrie NWR	318-336-7119
D'Arbonne NWR	318-726-4222



# POPULATION GROWTH MODELING

## HOW DO WE GET THERE?

*By Mike Olinde, Research Program Manager*

When people hear about population growth, it is unlikely that most think about wildlife. More than likely, they think about human population growth across the world. However, the ability to determine population growth for wildlife is of great benefit to wildlife managers, particularly when used in developing harvest management strategies.

Conceptually, a harvest management strategy should be based on factors that have direct biological meaning in the context of wildlife population dynamics (e.g., population size, harvest rate, survival rate, production, etc.). In addition, it should include decision criteria to initiate harvest regulation changes (more liberal or more restrictive) that are explicit, quantitative and derived from knowledge of population characteristics given various alternatives and the related factors governing population dynamics.

### **So how do wildlife managers get to this point?**

The mathematical model is not necessarily complicated; a relatively basic model is for population growth:

$$N_{t+1} = N_t \{S_A + S_J * P\}.$$

Simply stated, it means future populations are functions of current population size, survival of adults and juveniles and recruitment of females per breeding female. It may not sound very involved, but getting the data needed to have a reliable estimate requires a lot of work and often involves developing complicated models to enhance data sets.

However, the population model is just one aspect of a harvest management strategy and not necessarily the most important one. A harvest management objective is required. That is, what do we want? Do we want to manage for the maximum sustainable harvest, maintain a population at its current level, reduce or expand the population from its current level or maintain hunter numbers at the present level? While the basic equation stays the same, the answer to these important questions ultimately drives what should be done with hunting regulations after the result of the model is obtained. This approach assumes that harvest, at some level, influences populations.

Mourning dove is a species that can provide some insight into the process because managers are moving population growth modeling to the forefront of its harvest management strategy. Being a migratory species, dove hunting frameworks are set by the U.S. Fish and Wildlife Service (USFWS). States then set their seasons within the federal framework. Looking at the history of mourning dove regulations, one sees that the frameworks have been relatively stable for the past 4+ decades in the Eastern Management Unit (EMU), of which Louisiana is a part. A season length as long as 70 days with a 12-bird daily bag limit has been offered in the EMU since 1960. In 1982, the option of a 15-bird bag limit was offered, but the number of days associated with that option was only 45 days. This was liberalized to 60 days in 1983. These two options (70 days and 12 birds or 60 days and 15 birds) remained in place until 2008 when only one option (70 days and 15 birds) was offered.

Whether you care about dove seasons or not, you may be asking yourself why these changes were made. The early changes were largely in response to requests from states that wanted to harvest more birds before migration occurred, which was usually well before the end of those states' hunting seasons. Requests were usually granted because the general thought was that the options would not be detrimental based on earlier banding studies. However, since there was no uniform national season or harvest database, evaluation of these changes was not possible in the classical scientific sense.

There are now other data to help assess these regulatory changes. The Louisiana Department of Wildlife and Fisheries (LDWF) conducts an annual big and small game harvest survey. During 1991-2005, there were seven years of 70 days and 12 birds and seven years of 60 days and 15 birds. Using LDWF harvest statistics, it is clear that changing season structure had no impact on dove hunter participation or harvest in Louisiana. Dove hunter numbers averaged approximately 59,600 for the 12-bird bag years and approximately 59,800 for the 15-bird bag years. Likewise, mean days hunted (3.7 vs. 3.8), mean doves killed per day (5.0 vs. 4.9) and mean doves killed per season (18.4 vs. 18.8) were very similar

for the 12-bird bag and 15-bird bag years, respectively. While switching from 70-60-day seasons every other year during this period might have caused much consternation among Louisiana dove hunters, one can see that important knowledge was gained for mourning dove management.

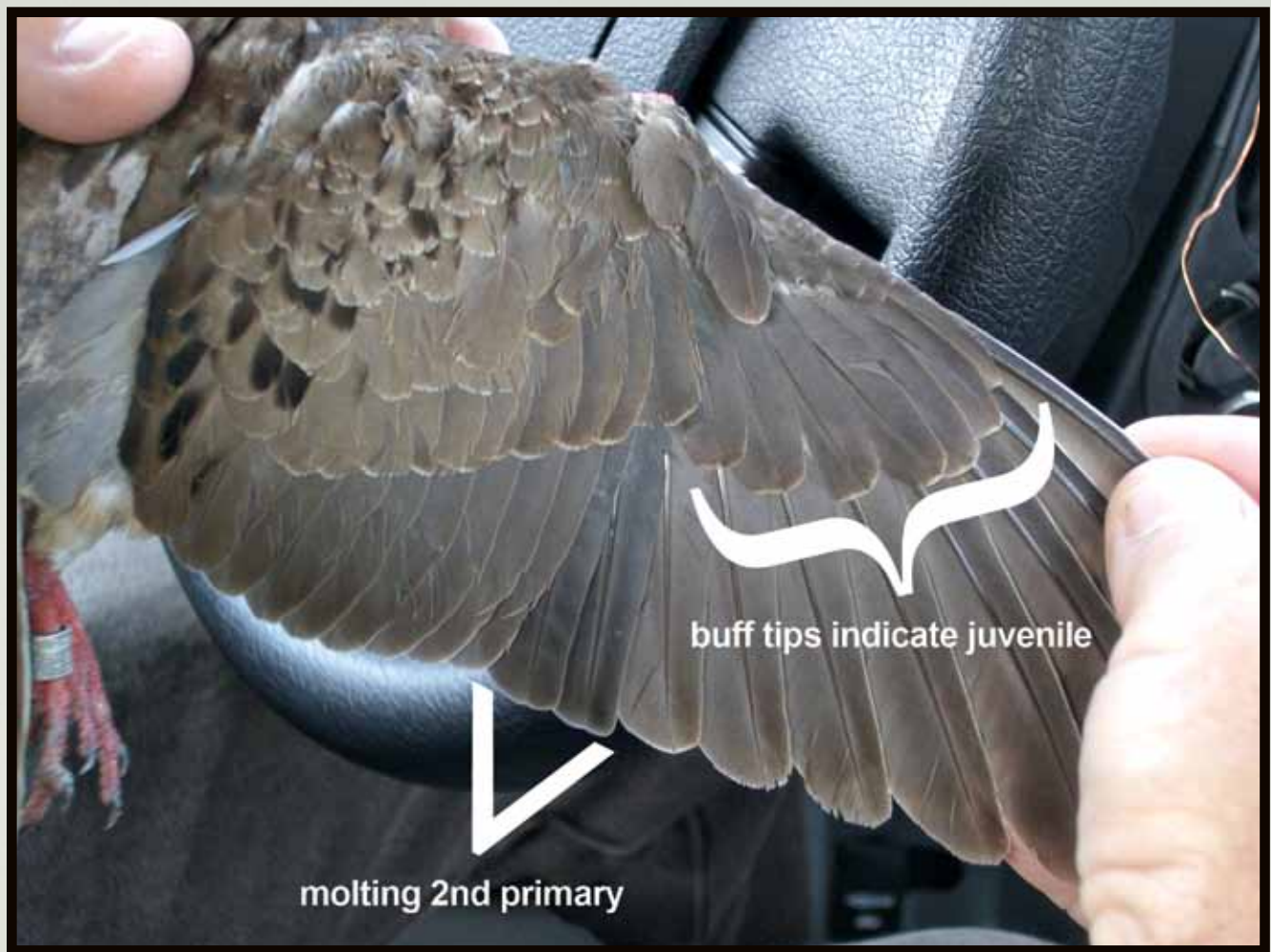
Another data set, the USFWS' Harvest Information Program (HIP) data for EMU states, which includes states that either selected 60-day or 70-day options, shows the average dove hunter makes about three trips and harvests about six doves per trip annually. This also suggests that little, if any, impact on dove hunter behavior would occur by adding 10 days to the 60-day and 15-bird option. Thus, we now have two independent sets of data, one federal and one state, that illustrate the same result. As a consequence of these and more in depth analyses of HIP data, only a 70-day and 15-bird option was offered to EMU states beginning in the 2008-2009 season.

### **Why was moving to a single season length option for mourning doves important?**

When developing models, the "keep it simple" approach is often preferred because fewer variables in a model usually results in a higher probability of understanding the relationship between those variables. With mourning doves, two season length/bag options added another level of uncertainty to our model. Even though existing data suggest there was little difference, having a single option makes good sense because it eliminates the need to account for the possibility of differences in the future. Although this seems like a small step, it took several years to achieve.

Field work, including banding and population surveys and subsequent mathematical modeling, are essential to the process and not small undertakings. Thinking back to the information needed to develop a harvest management strategy (population size, harvest rate, survival rate and production), mourning dove biologists from across the country identified methods to get to these answers. Banding is the backbone for obtaining much of the information needed for mourning dove population growth modeling, but most of the major band-





ing studies were conducted three to four decades ago. To determine the feasibility of renewing large-scale mourning dove banding, a pilot study involving 29 states was conducted from 2003-2005. During this period, nearly 100,000 doves were banded, and about 5,000 recoveries were reported. It provided the foundation for mourning dove banding field and data management protocols, updated reporting, harvest, and survival rates, trained new biologists in mourning dove banding and illustrated the states' commitment to an operational banding program, which is needed to use population growth as the foundation of harvest management.

Regionally, it also resulted in interesting findings relative to mourning dove harvest and survival. For example, the harvest rate for mourning doves was much lower in the 2000s than in the 1970s, but survival was generally lower in the 2000s than in the 1970s. This raises the question, "Is our environment more hostile to mourning doves today than in the 1970s?" Banding studies of the 1970s studies suggested that about 50 percent of the dove harvest in Louisiana was local birds. Today that value appears much higher (approximately 75 percent). Some of this difference is likely due to the na-

tional distribution of banding, but nonetheless it raises questions. Also, more than 95 percent of the recovered Louisiana banded birds were taken in Louisiana regardless of age. Other states where Louisiana banded birds were recovered included Alabama, Georgia, Kentucky, Mississippi, Ohio, South Carolina and Texas.

Mourning dove banding is now conducted annually from July 1 through around Aug. 15 in more than 30 states. However, if hunters do not cooperate by reporting banded birds that they shoot, it undermines good management and erroneous decisions may be made. As a consequence, all hunters are encouraged to report any banded bird they take to the U.S. Geological Survey. Bands can be reported by calling the toll-free number, 800-327-BAND, or on the internet at <http://www.pwrc.usgs.gov/bbl/homepage/call800.htm>.

Annual production is determined from wing surveys. There have been wing surveys for other species for a number of years, but not for mourning doves until recently. Because production is an important component of the population growth model, a wing survey for mourning doves was initiated in [continued on 23]





# THE PHYSIOLOGY OF ANTLER GROWTH

*By James M. LaCour D.V.M., Wildlife Veterinarian*

Horns of cattle, bison, sheep and goats are composed of a bony core covered by a tough keratinized growth originating from the epidermis of the horn base. These structures grow the entire life of the animal and are not shed. Antlers of deer, elk, moose and caribou are different. They are solid outgrowths of the animal's skeletal system and are deciduous, meaning that they are shed annually. In fact, antlers are the most rapidly growing form of bone known to the scientific world, with some species such as caribou growing up to one inch of new bone per day.

With the exception of caribou, only male animals exhibit antlers. These antlers are used defensively, as well as to express dominance. The fact that antlers are deciduous allows replacement of damaged antlers and creates a mechanism for growing the larger antlers associated with dominance.

Antlers are basically the same composition as bone. They are formed primarily of calcium, phosphorous and trace minerals with a collagen matrix. The size of an animal's antlers is determined by several factors such as age, genetics and the quantity and quality of nutrition available to that animal. They grow from two permanent stumps called pedicles. Pedicle production is promoted in the presence of the male hormone testosterone and inhibited by the female hormone estrogen. This is what causes does to be antlerless.

Pedicles are evident as cowlicks or hair swirls on male fetuses in utero. After birth, the pedicles begin to enlarge, forming the "bumps" that give rise to the name "button buck" by six months of age. Much like teenagers, young bucks require a lot of energy (food) because they are growing fast, thus not leaving much for antler development. This is typically why many yearling bucks, particularly those born later in the summer, have spikes or small forked horns. Between the second and third year, body growth slows, leaving more nutrition available for antler development. Nearly all body growth is complete by year four, and the largest sets of antlers are usually produced in the fifth and sixth years of life. As deer mature, the main beams



*A 6-month-old "button buck" exhibiting horn buds.*



*Chronologically arranged "shed" antlers of bucks exhibiting their first year antlers on bottom and final antlers at the top.*

Kerr Research Facility



*A typical buck in velvet.*

may thicken, the spread widen and the points lengthen, but the basic shape of the antlers remains similar, unless pedicle damage or injury to antlers in velvet occurs. The shape of the antlers and any unusual characteristics may be hereditary.

Nutrients for antler development are supplied by blood flow to the antlers. Arteries are found in growing antlers within the center of the bony core and in the velvet that covers the antlers. Antlers develop in response to lengthening photoperiod coupled with a low testosterone level. Typically, antlers are visible by May, and by August most have reached full size. Upon nearing full size, the arteries in the center of the antlers are choked off, and the antlers receive nutrients only from the vessels in the velvet layer. As fall approaches, bucks' testosterone levels begin to rise in preparation for the upcoming rut. Testosterone signals antlers to stop growing. Blood flow to the antlers is completely stopped and the velvet layer dies. At this point bucks will frequently "rub" or polish their antlers on tree limbs, tree trunks, etc.

During the ensuing rutting period, many bucks will fight, sometimes breaking their antlers. Since these antlers are made of solid bone and no longer have a blood supply, they neither bleed nor become infected when they are broken.

After the rut ends, bucks' testosterone levels drop dramatically. This triggers cells called osteoclasts to dissolve the bony union of the antlers with the pedicles. The process is very rapid as exhibited by the fact that a deer may be dragged by its antlers one day only to have them fall off due to their own weight the next day. Most shedding occurs in February and March.

Next, something amazing occurs. A blastema forms at the pedicle and autogenous regeneration occurs. This is the same process by which a lizard regrows its tail and a salamander replaces a severed limb. Antler growth is stimulated once again by increasing day length and the entire process starts over again. Disruption of the pedicle during this early stage may result in abnormal antler growth. Interestingly, a damaged pedicle will usually result in deformed antlers for the rest of that deer's life.

Minerals, particularly calcium and



# DEER TAGGING HARVEST ESTIMATES

*By Scott Durham, Deer Study Leader*

phosphorus, used in antler growth are supplied by dietary intake and resorption from bones. This is similar to the process that happens in does during milk production. Soil type and availability of nutrients play vital roles in antler development. Currently, biologists with the Louisiana Department of Wildlife and Fisheries are initiating research on the role that different minerals in the soil play in antler development.

Nutrients available for antler production will vary regionally based on soil type, climate and water supply. Foods should be readily available, palatable and balanced for energy as well as macro- and micromineral content. The timing of nutrition is also very important. Food plots planted Oct. 1 will have no impact on antler growth unless they consist of plants such as clover which offer springtime nutrition. Grains such as corn supply plenty of energy for antler growth in the spring; however, they are not properly balanced for calcium and phosphorous uptake. As a result, deer must also depend on other forages as well as body stores of calcium to maximize the usefulness of grains for antler production.

Occasionally, we find bucks without antlers and does with antlers. These abnormalities are generally caused by a hormonal problem. Castrated bucks will not produce antlers hence bucks that have severe testicular trauma or poor testicular development may not grow antlers. Interestingly, research has shown that bucks castrated during the velvet stage never shed their antlers. Instead, the antlers stay covered in velvet and grow during the appropriate photoperiods. Does that grow antlers have testosterone production within their bodies and form pedicles that result in antler development.

As stated earlier, the size of a buck's antlers is determined by age, genetics and nutritional factors. As such, habitat management and deer density play a vital role in quality antler development. In the quest for large-antlered, wild, native white-tailed deer, management practices can affect antler size. These practices include reducing buck harvest to allow deer to reach advanced ages and ensuring that an area has an appropriate food supply to nurture antler growth.

In short, antler production is one of the marvels of Mother Nature, akin to the rise of the Phoenix from fire and ashes. Maybe the next time you see a buck, you will think about the physiological occurrences of his body and the sequence of events that may one day make him a much desired trophy. Good luck and happy hunting!

The first year of the mandatory deer tagging program is now history. Most hunters were very positive about the program and supported LDWF efforts. The statewide reported harvest was just over 95,000 deer. When the combined harvests of the Deer Management Assistance Program (DMAP), the Landowner Antlerless Deer Tag Program (LADT) and WMA managed hunts (approximately 20,000 deer) are added, the statewide validated harvest should be approximately 115,000. This is 43 percent below the average annual harvest estimate of 200,000 for recent years that was obtained through the LDWF annual mail harvest survey. (The 200,000 estimate seems like a reasonable one based on simple modeling and estimated deer densities in the state).

Some may be asking what the mail survey is since they have never been asked to report harvests prior to the tagging program. Others may wonder, why there are two surveys. The mail survey is a statistically sound survey of randomly selected resident hunters between the ages of 16 and 59, inclusive. It was designed in collaboration with LSU's Department of Experimental Statistics and has been conducted annually after the hunting seasons for more than four decades. The mail survey samples enough hunters to obtain estimates with good precision (about  $\pm 5$  percent) hunter, harvest and days hunted for deer hunting. For example, if the harvest is extrapolated to be 200,000, then we are 95 percent confident that the actual value as reported by hunters is between 190,000 and 210,000. However, the mail survey does not give us extensive annual data at the parish level, nor does it account for inherent biases associated with various mail survey techniques. The new tagging program provides a mechanism to obtain annual parish level deer harvest data, enhanced capability to enforce the deer bag limit and an actual count of the deer kill.

So, what can explain some of the differences between the tagging program and the mail survey estimates? Implicit in the harvest value derived from the tagging program are some assumptions. An extremely important one is that all persons who killed deer report their kill. It is possible that some hunters that tagged their deer decided not to or forgot to report their deer. Anecdotally, we know from enforcement agents in the field that tagging compliance varied widely (50-90 percent) depending on the region. Consequently, our first basic assumption was likely not accurate this year and the actual harvest was likely higher. How much higher depends on the actual compliance rate for validating harvested deer and other assumptions. For example, do we assume that only persons harvesting a deer validate a kill? In harvest surveys, it is known that some people indicate that they harvest more than they actually do. This is often referred to as prestige bias. Do we assume that prestige bias does not exist in the tagging system? It seems like a safer assumption, but we really don't know at this time. Do all persons who hunt deer get tags before hunting? Again, we don't know this as yet, but it's probably safe to say that everyone who is exempt from a license requirement did not get tags this year.

As with any new program, compliance during the initial or startup years is often not as good as it is after the program has become established. LDWF thanks all those hunters who tagged and reported their deer and urges those that did not properly participate in the tagging program this year, do so next year. It is the law, and enforcement efforts will target those who do not comply. More importantly though, our goal is to use these data for managing Louisiana's deer herds. Without full hunter cooperation, we may make management decisions relative to deer seasons that could either hurt our deer resource or unduly restrict our deer hunters.

Although the season is over and the reporting period for tagging has ended, it is premature to provide exact harvest numbers because DMAP, LADT and WMA managed either-sex hunt data are not available. Based on the last year's numbers, data from these sources represent 15-20 percent of the harvest, and these sources are likely concentrated in many of the bottomland areas. By mid-summer, the data set should be complete, and parish, regional and other comparisons will be provided.



# LANDOWNERS FOR WILDLIFE PROGRAM

*By Randy Myers, Biologist Program Manager*

The state of Louisiana is blessed with having over 30,000 square miles of wildlife habitat that ranges from diverse coastal marsh to upland hardwoods. According to the state's Comprehensive Wildlife Conservation Strategy, these habitats provide a permanent or temporary home to over 900 species of vertebrate animals. Over 90 percent of this habitat is in private ownership.

The Louisiana Department of Wildlife and Fisheries (LDWF) is the state agency responsible for managing and protecting these wildlife and fisheries resources and their supporting habitats through replenishment, protection, enhancement, research, development and education. While LDWF owns and/or manages over 1.5 million acres of habitat, the goals and objectives of LDWF can not be accomplished without the assistance of the private landowner.

In fact, private lands are essential to most wildlife populations and the fate of wildlife can be determined by what occurs on these lands. Private landowners can affect changes that would benefit wildlife if they are provided with sufficient technical and financial assistance.

In 2008, LDWF began the Landowners for Wildlife Program (LFW). This

new program was created as a way to help private landowners improve wildlife habitat and associated recreation on their land. To participate, the landowner must first contact a local LDWF regional office. The local wildlife biologist will meet with the landowner to discuss the objectives and conduct a site visit. The biologist will then work with the landowner to provide the assistance needed to achieve the landowner's objectives. The level of assistance provided will depend upon the landowner's desire and may include a comprehensive wildlife management plan.

Assistance from LDWF biologists and the written plan are provided free of charge. The costs to implement the individual practices identified in the written plan are the landowner's responsibility. However, the landowner may be eligible to enroll in certain cost-share programs. These programs may include the Wetland Reserve Program (WRP), Conservation Reserve Program (CRP), Wildlife Habitat Incentive Program (WHIP), Louisiana Waterfowl Project (LWP), Environmental Quality Incentives Program (EQIP), Forestry Productivity Program (FPP) and the Forest Lands Enhancement Program (FLEP). In addition, if the landowner is already enrolled in non-cost share programs such as Deer Management Assistance Program (DMAP), Forest Steward-

ship (FSP) or the Landowner Antlerless Deer Tag Program (LADT), the biologist can easily "plug" these programs into the plan. If currently working with a resource professional such as a consulting forester, the biologist will coordinate appropriately to include all resource objectives in the plan.

For more information about the LFW program contact your local LDWF regional office.



**Region 1** 318-371-3050  
9961 Hwy 80, Minden, LA 70155

**Region 2** 318-343-4044  
368 Centurtyel Drive, Monroe, LA 71203

**Region 3** 318-487-5885  
1995 Shreveport Hwy, Pineville, LA 71360

**Region 4** 318-757-4571  
261 Wildlife & Fishery Rd, Ferriday, LA 71334

**Region 5** 337-491-2575  
1213 N. Lakeshore Dr, Lake Charles, LA 70601

**Region 6** 337-948-0255  
5652 Hwy 182, Opelousas, LA 70570

**Region 7** 225-765-2360  
2000 Quail Drive, Baton Rouge, LA 70808





# ORPHANS? PROBABLY NOT...

*By Carrie Saylers, Nuisance Wildlife Coordinator*

Spring and summer are wonderful times of year. They are full of new life and opportunities for everyone to see and experience the resurgence of nature. Unfortunately, during these seasons, many individuals also notice newborn animals which appear to be injured or orphaned. Human nature being what it is, people frequently are unable to turn their backs and “let nature take its course” for these young animals. Many cannot resist the temptation to help even when no help is needed. It is natural for wildlife to leave their nests or dens before they are fully capable of caring for themselves and they generally should be left alone.

## **What should you look for to determine whether a young animal needs help or not?**

The accompanying diagrams from the National Wildlife Rehabilitators Association website ([www.nwrwildlife.org/home.asp](http://www.nwrwildlife.org/home.asp)) provide a good thought process to answer this question.

## **What if I want to try to raise the animal?**

Keeping the animal yourself is not an option. In fact, in most states, including Louisiana, it is against the law to keep wild animals if you do not have the proper permit, even if you plan to release it. In Louisiana, a wildlife rehabilitation permit is required. The purpose of this permit is to allow private individuals to legally house animals while they are rehabilitated and to ensure that these individuals are qualified to do so.

There are two types of permitted rehabilitators in Louisiana. The first are permitted by the state to care only for mammals, with the exception of bears and white-tailed deer. Anyone who finds either a bear or deer should leave the animal alone. The second type of rehabilitator is permitted by the federal government to care for most migratory birds including hawks, owls, and songbirds.

The Louisiana Department of Wildlife and Fisheries (LDWF) or a wildlife re-

habilitator should only be contacted after the question and answer process provided in the diagrams suggests that the animal is in need of special attention. However, there are several things you should keep in mind. LDWF does not have a wildlife rehabilitation facility. It refers individuals to permitted rehabilitators. In addition, LDWF and most wildlife rehabilitators do not provide transportation of injured or orphaned animals to facilities. As a consequence, you would be required to transport the animal to the rehabilitator.

As with a lot of things, demand for rehabilitators may exceed their capacity to care for animals, and sometimes there are no rehabilitators within an individual's city or parish. This often results in people briefly housing animals until they are able to make arrangements with a permitted rehabilitator. However, this should not be confused with the right to try to rehabilitate the animal yourself. Only authorized wildlife rehabilitators can legally house these animals for an extended time.

If you find yourself in a situation where you have to provide temporary care for an animal prior to its transfer to a wildlife rehabilitator, the following guideline provided by the National Wildlife Rehabilitators Association may be helpful.

1. Prepare a container. Place a clean, soft cloth with no strings or loops on the bottom of a cardboard box or a cat/dog carrier with a lid. If the lid doesn't have air holes, make some.
2. Protect Yourself. Wear gloves, if possible. Unfortunately, animals don't realize that you are trying to help them. Some mammals may bite or scratch or birds may poke with their beaks or scratch with their talons to protect themselves.
3. Cover the animal with a light sheet or towel.
4. Gently pick the animal up and put it in the prepared container.
5. Wash your hands after contact with the animal.
6. Warm the animal if it is cold outside or if the animal is chilled. Put one end of the container on a heating pad set on low.
7. Tape the box shut.
8. Note exactly where you found the animal.
9. Keep the animal in a warm, dark, quiet place.
  - a. Don't give it food or water
  - b. Leave it alone; don't handle or bother it
  - c. Don't let it loose in your house
  - d. Keep children and pets away

10. Contact a wildlife rehabilitator or state agency as soon as possible.
  - a. Don't keep the animal at your home any longer than necessary
11. Get the animal to a wildlife rehabilitator as soon as possible after you have made the necessary arrangements with a rehabilitator/facility.
12. Wash anything the animal was in contact with (for example towels, blankets and pet carriers) to prevent the spread of disease and/or parasites to you or your pets.

The urge to help animals is nothing new; humans have been helping distressed wild animals for centuries, but not always to the animal's benefit. It has only been within the last twenty to thirty years that wildlife rehabilitation has grown into a structured program. We are fortunate in Louisiana to have both state and federally permitted wildlife rehabilitators. Rehabilitators mimic nature as much as possible, and as in nature, not all animals survive. So, remember that a young animal's best chance for survival is with its natural mother and, despite your best intentions, you must be legally permitted in order to house any wild animal. Also, if you do deal with a wildlife rehabilitator, keep in mind that the ultimate goal is to return the animal to the wild. This allows you and future generations to experience nature at its best--wild.



# I Found a Baby Mammal Now What?



Is the baby animal hurt or sick?  
(Bleeding, shivering, vomiting,  
attacked by a cat or dog?)

No

Yes

Can you find the nest or  
den? Is it intact?

Yes

No

Put baby in  
the nest or  
den.

Put baby in a shallow box  
close to where it was  
found. Keep it warm  
but out of the sun.

Watch for the mother  
for 4-6 hours. Stay out  
of sight. Mothers will *not*  
return if any people or  
pets are present.

Did the mother return?

Yes

No

Leave the area.  
Baby is okay.

Call a wildlife  
rehabilitator.

Call a wildlife  
rehabilitator

Unable to reach a rehabilitator?  
Call your state wildlife agency  
or a wildlife veterinarian.

If you're unable to reach any  
of the above, see instructions  
on back of this page: "How to  
Rescue Baby Mammals"

To find a wildlife rehabilitator  
in your area, contact:

- Your state wildlife agency
- Humane Society
- Audubon Society
- wild bird stores
- city animal control officer
- veterinarians (wildlife/exotic)
- Coast Guard or Marine Patrol
- US Fish and Wildlife Service
- (online) Wildlife Rehabilitation Information Directory

A baby mammal's  
best chance  
for survival  
is its  
mother!

## If you find baby bunnies:



- If their nest has been damaged, it can be repaired. Look for a shallow depression lined with grass/fur. Place babies in nest with light layers of grass to hide them. Leave the area, or the mother won't return. (Mothers return at dawn & dusk.)
- If you find healthy bunnies that are 4-5 inches long, able to hop, with eyes open and ears up, they do not need help. They are able to survive on their own. Leave them alone. Questions? Call a wildlife rehabilitator.



## If you find a seal pup or fawn alone:

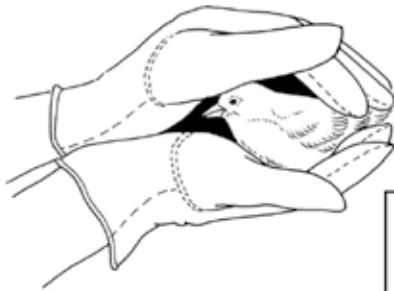


- Know that it's normal behavior for mothers to leave their babies alone while they feed.
- But, if the baby looks cold, hungry, diseased, or confused, or if dogs, other animals, or people threaten its safety, call a wildlife rehabilitator or park ranger.
- Otherwise, the seal pup or fawn is safe. Leave it alone and leave the area. Mothers will *not* return if any people or pets are present.

From "Healers of the Wild" by Shannon Jacobs  
Published by Johnson Books  
800-258-5830 • [www.johnsonbooks.com](http://www.johnsonbooks.com)



# I Found a Baby Bird Now What?



Is the bird hurt or sick? (Unable to flutter its wings, bleeding, wings drooping unevenly, weak or shivering, attacked by a cat or dog?)

No

Yes

To find a wildlife rehabilitator in your area, contact:

- Your state wildlife agency
- Humane Society
- Audubon Society
- wild bird stores
- city animal control officer
- veterinarian (wildlife/exotic)
- Coast Guard or Marine Patrol
- US Fish and Wildlife Service
- (online) Wildlife Rehabilitation Information Directory

Is the bird feathered?

No

Yes

Call a wildlife rehabilitator

It's a nestling. (Needs help!) Can you find the nest? Is it intact?



No

Yes

Make a substitute nest. Poke holes in bottom of berry basket/margarine tub. Line with dry grass, the old nest, or pine needles. Hang from original or nearby tree.

Put baby back in nest. Watch from a distance. Are parents visiting the nest?

Yes

No

Leave the area. Baby is okay.

Put baby in bushes or on tree limb nearby. Watch from a distance. Are the parents nearby?

No

Yes

Call a wildlife rehabilitator.

Leave the area. Baby is okay.

Leave the area. Baby is okay.

Unable to reach a rehabilitator? Call your state wildlife agency or a wildlife vet.

If you're unable to reach any of the above, see instructions on back of this page: "How to Rescue Baby Birds"

A baby bird's best chance for survival is its mother!

Put baby in the nest. Observe from a distance. Are parents visiting nest?

Yes

No

Leave the area. Baby is okay.

Call a wildlife rehabilitator.

If you find a baby duck, goose, quail, or killdeer:

- If you know the mother is dead, or if the baby is injured, call a wildlife rehabilitator right away.
- If baby is separated from the mother and you know where she is, place baby close by so she can hear it. Watch from a distance.
- If the mother is not found or does not claim the baby within an hour, call a wildlife rehabilitator. If you cannot reach one, read rescue information on the back of this sheet.



From "Healers of the Wild" by Shannon Jacobs  
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# FOREST STEWARDSHIP PROGRAM

*By Cody Cedotal, Forest Stewardship Biologist*

Forest stewardship is the wise use of resources that maintains and enhances the value of forests. Many Louisianans purchase or already own land with this primary goal in mind. However, they may be unsure how to accomplish this task. The Forest Stewardship Program (FSP) may be the solution. This program offers private forest landowners cost-free technical assistance and recognition for being good stewards of the land.

Before evaluating and developing a management plan for properties, landowners must decide what it is they want from their land. Objectives may include, but are not limited to, timber production, wildlife habitat enhancement, forest recreation enhancement, aesthetics or environmental enhancement. Many landowners choose to manage their property for timber production, but also want to enhance the area for white-tailed deer and/or eastern wild turkey. These objectives are common among Forest Stewardship landowners. Other landowners prefer to manage their property to enhance recreational opportunity for bird watching, wildlife observation or hiking. Improving aesthetics is another common objective. Regardless of the property, a plan cannot be developed unless those assessing it know what the landowner's objectives are.

Once broad objectives have been established, a site inspection is necessary to assess the current condition of the property. Many agencies participate in FSP to provide quality assistance to landowners. Representatives from the Louisiana Department of Wildlife and Fisheries, Louisiana Department of Agriculture and Forestry and Natural Resource Conservation Service may all be present at the property's inspection. After discussing management options and impacts with the landowner, a written management plan is developed by one or more of the resource professionals involved with the property. The multiple-use management plan cov-

ers a 10-year period and is designed to assist the landowner by providing specific management recommendations on how to accomplish his or her stated objectives.

Management plan development is the first step towards certification as a Stewardship Forest. A property is eligible for certification once some of the management recommendations included in the plan are implemented. Through certification, a landowner receives recognition among peers and resource professionals for being a good steward of the land. During the certification process, a team of resource professionals re-inspects the property to ensure that the recommended management activities were conducted in a manner conducive to good forest stewardship. After certification, the landowner will receive a sign to display on the property and a laser-engraved plaque, recognizing that he or she is an active member in FSP.



There are other benefits associated with FSP. Participating landowners receive the FSP Newsletter which addresses topics relevant to land management in Louisiana. The resource professionals involved in FSP can also provide information on other assistance and cost-share programs for which the property may qualify, such as the Forestry Productivity Pro-

gram (FPP), Conservation Reserve Program (CRP), Wetland Reserve Program (WRP), Wildlife Habitat Incentives Program (WHIP), Environmental Quality Incentives Program (EQIP) and the Forest Lands Enhancement Program (FLEP).

For more information on the Forest Stewardship Program, contact Mike Buchart, FSP Coordinator, Louisiana Department of Agriculture and Forestry at 225-925-4500 or Cody Cedotal, FSP Biologist, Louisiana Department of Wildlife and Fisheries at 225-765-2354.

# LOUISIANA PROJECT

*By Paul Link, North American Waterfowl Coordinator*

Wetlands are among the world's most productive environments and support high biological diversity; however, more than half of the nation's wetlands have been drained in the past two centuries. Wetlands have been drained primarily for agriculture production because they typically contain very fertile soils. Roughly 75 percent of the nation's wetlands are found on private lands, and thus play a crucial role in providing habitat for millions of waterfowl and other wetland-dependant wildlife. Thankfully, many private landowners take great pride in being good stewards of their property. These landowners recognize that providing wetland habitat for waterfowl doesn't have to come at the expense of their livelihood, but rather can compliment their farming operation and provide many agricultural and societal benefits. Several public and private habitat programs are available to landowners to help conserve and manage their wetlands, and some may be used in conjunction with each other. These programs may provide technical and financial incentives to landowners wanting to create or enhance wetlands on their property. One such program is the Louisiana Waterfowl Project (LWP).

LWP is in its 17th year of providing assistance to private landowners wishing to create, restore, enhance or manage critical wetland habitats for waterfowl and other wetland-dependant wildlife. It is a partnership between private landowners, Ducks Unlimited, Inc., USDA's Natural Resources Conservation Service, Loui-



# WATERFOWL



*Large water control structure for managing water levels in marsh.*



*Excellent waterfowl habitat created by flooding bottomland hardwood during the winter.*

siana Department of Wildlife and Fisheries (LDWF) and U.S. Fish and Wildlife Service. Each partner contributes funding and/or in-kind services (e.g., earthmoving, administrative, engineering, or technical assistance) to the project, with Ducks Unlimited acting as the primary program liaison. LWP's goal is to improve waterfowl habitat in the state.

Lands eligible for LWP vary by geographic region. In north Louisiana, effort is directed at restoring natural water patterns to wetlands and protecting other quality wetlands through conservation easements. These areas primarily consist of moist soil units, bottomland hardwood forests and cypress-tupelo brakes. Much of the historic bottomland hardwood forest was converted to agriculture and is prone to flooding, which regularly compromises agricultural production. Thus, owners of these types of lands should consider managing them for waterfowl hunting. Bottomland hardwood forests are very important to mallards, gadwall and wood ducks and are also utilized by black bears, rabbits, squirrels, turkeys, deer, songbirds, a variety of reptiles and amphibians and many other species. Bottomland hardwood forests also reduce the risk and severity of flooding to downstream communities.

Partner biologists advise landowners in north Louisiana on proper management of forested wetlands to ensure important mast-producing tree species are not stressed by water management activities. For instance, early fall flooding is more detrimental than late spring flooding to oaks and other desirable species. Effort should be made to delay flooding until

leaves have changed color and trees have gone dormant for the winter. De-watering should begin when trees begin budding in the spring. Landowners are also encouraged to vary the depth, duration and timing of flooding every year. Partner biologists can also help landowners develop a management plan to maximize project potential for waterfowl at each project site.

Coastal marsh, moist soil and scrub/shrub lands are targeted for restoration, enhancement or protection in south Louisiana. These habitats are extremely important to wintering waterfowl. They are also vital to the nation's seafood industry, oil production infrastructure and protection of coastal communities from hurricane storm surges. However, thousands of acres of shallow emergent marsh have been replaced with large expanses of open water, and many coastal marshes are in need of repair because of repeated hurricane damage. If these areas don't have proper protection from hydrologic alteration, saltwater intrusion, shoreline erosion and subsidence, they quickly deteriorate into less beneficial waterfowl habitats. In addition to the program's benefits to waterfowl, LWP projects reduce soil erosion, retain soil nutrients, increase sediment deposition and improve water quality, groundwater recharge and flood-water storage.

Most landowners possess the tools to create valuable wetland habitats, and this program alleviates a portion of the financial burden of infrastructure costs and provides the necessary technical assistance. Participating landowners sign 10-year or longer Wetland Development

Agreements with LWP to receive technical and cost-share assistance and, in some instances, pipes and water control structures. The landowner agrees to provide the labor, equipment, levee construction, water control structure installation and routine maintenance costs associated with the wetland development and to maintain appropriate water levels for waterfowl for a minimum of four months during the wintering period. The landowner retains all property rights and may lease the land for hunting, fishing and other recreational activities.

Coastal erosion, economic threats to rice agriculture, river channelization and flood prevention projects that act to drain bottomland hardwood forests are not going to be reversed quickly. It is imperative that we manage the remaining wetland habitats for waterfowl wintering in Louisiana. During the 17 years of LWP, nearly 93,000 acres of seasonal wetlands have been restored and technical assistance has been provided on more than 665,000 acres. LWP is just one of many programs designed to promote wildlife habitat conservation on private lands. Landowners are encouraged to contact local LDWF private lands biologists and explore the habitat conservation program options through state, federal and non-government organizations that will improve waterfowl habitat on their lands. The future of waterfowl and waterfowl hunting depends upon private landowners and proper management of their wetlands.





# HARVEST INFORMATION PROGRAM

*By Larry Reynolds, Waterfowl Study Leader*

Estimating the number of ducks and geese harvested each year is critical to annual hunting regulation decisions and of great interest to waterfowl hunters. In 1998, a new program for generating these harvest estimates, the Harvest Information Program (HIP), was implemented to improve those estimates and address allegations of inadequate harvest information coming from anti-hunting interests. Under the Migratory Bird Treaty Act, hunting seasons are closed unless justification is provided to open them. Harvest estimates are an important component of that justification.

The sources of information to estimate harvests, both prior to and since

HIP became operational, are hunter questionnaires, wings from harvested ducks and tails from harvested geese submitted by selected hunters to the U.S. Fish and Wildlife Service (USFWS). Each year, hunters are randomly selected and sent a waterfowl hunting record form to keep track of the number of days hunted and waterfowl killed. At the end of the season, the forms returned to USFWS provide data to estimate the number of active hunters, how many days they hunted and how many ducks and geese were taken. Prior to HIP, this portion of the harvest data collection was called the Questionnaire Survey. From the hunters who returned hunter record forms last season and reported killing at least one duck or goose, another group is randomly selected and asked to remove a wing from each duck and tail feathers from each goose they harvest during the hunting season. Hunters are given envelopes for sending those "parts" to USFWS; thus, this portion of the harvest data collection is called the Parts Survey. In late-February, waterfowl biologists gather to determine the species and age of each duck wing and goose tail, as well as the sex of each duck wing at a meeting called the Waterfowl Wing Bee (WWB). Data from the WWB are used to estimate species composition and age and sex ratios of the harvest. The Questionnaire and Parts Surveys are then combined to generate estimates of hunter activity, ducks and geese killed by species and age and sex ratios for each state and flyway. Estimates are published by USFWS each July in reports that are available on the internet at: <http://www.fws.gov/migratorybirds/reports/Hunting-Statistics/HuntingStatistics.htm>

Although the actual information used to generate the harvest estimates remained the same when HIP was implemented, the new program intended to address a growing problem with how hunters were selected to participate in

the component surveys. Prior to 1998, the harvest surveys were piggy-backed on federal Duck Stamp sales. Post offices were randomly selected and were sent contact cards to be given to hunters who bought a federal Duck Stamp. Returning a completed contact card to the USFWS made them eligible for the Questionnaire Survey. Unfortunately, many of the busier post offices refused to issue the contact cards or threw them away. As a consequence, many hunters who should have been eligible were not included.

More importantly, local license vendors increasingly stocked federal Duck Stamps so their customers could purchase all license requirements at one place. As a result, fewer hunters purchased stamps from Post Offices so the potential number of hunters from which a sample could be selected for the harvest surveys dwindled further. Questions then arose about the representativeness of the sample and, consequently, the quality of the data and resulting estimates. That was a particular problem for the Parts Survey, which required a hunter to successfully participate in the Questionnaire Survey before being eligible for selection. In the mid-1990s, the biologist in charge of the Harvest Surveys Section of USFWS reported that using every eligible hunter for the Parts Survey in Louisiana did not provide adequate data for the assessment. So, something had to change so that more hunters were available to be selected for the surveys.

The primary goal of HIP is to generate a list of names and addresses for every migratory bird hunter from each state so that an adequate representative sample of hunters can be selected for the harvest surveys. Although HIP is a federal program requiring all migratory bird hunters to be certified, each state controls how it is administered. Certifications must be provided to USFWS every two weeks. In Louisiana, the HIP permit is free of charge and is obtained when hunters purchase a license indicating an intention to hunt migratory birds. Hunters can also get the HIP permit on-line or over the telephone. Hunters are required to be HIP certified in every state in which they hunt migratory birds. For example, a Louisiana waterfowler who also hunts doves, ducks or any other migratory bird in Texas and North Dakota that same year must also have a HIP permit in each of those states.

Another goal of HIP is to classify hunters by level of harvest to get the most efficient sample from which to estimate harvest. When registering with HIP, hunters are asked how many doves, ducks,



State	Ducks Killed		Active Adult Hunters	
	Post Office	HIP	Post Office	HIP
Alabama	143,685	195,800	15,230	14,200
<b>Arkansas</b>	<b>1,123,766</b>	<b>1,407,700</b>	<b>57,818</b>	<b>87,000</b>
Illinois	445,294	397,400	46,525	33,500
Indiana	141,743	119,500	24,347	18,100
Iowa	248,983	296,400	27,996	25,000
Kentucky	118,558	202,100	17,173	22,800
<b>Louisiana</b>	<b>2,056,857</b>	<b>1,194,500</b>	<b>86,135</b>	<b>55,400</b>
Michigan	304,002	190,700	58,037	27,900
<b>Minnesota</b>	<b>647,110</b>	<b>855,400</b>	<b>128,322</b>	<b>91,300</b>
Mississippi	245,025	277,900	21,487	15,500
Missouri	487,120	559,500	37,895	33,100
Ohio	112,499	144,900	28,065	19,700
Tennessee	303,233	406,100	33,179	26,600
Wisconsin	253,040	369,900	63,812	62,100
<b>Flyway Total</b>	<b>6,630,916</b>	<b>6,617,800</b>	<b>646,209</b>	<b>532,200</b>

*Table 1. Duck harvest and active hunter estimates for the Mississippi Flyway, 2001-02 season.*

geese, woodcock, rails, snipe, gallinules and coots they killed during the prior season. Based on their answers, waterfowl hunters are put into three groups: those who reported killing zero, one to 10, and more than 10 ducks and geese the prior season. USFWS then selects about 2 percent of the “zero” group, 4 percent of the “one to 10” group and 8 percent of the “more than 10” group. Many hunters mistakenly conclude the harvest estimates come directly from the answers provided during the HIP permitting process and thus question the accuracy of the harvest estimates. Of course, it isn’t possible for estimates to come from those questions because the harvest estimates are published in July, and most waterfowl hunters don’t buy their hunting license and answer the HIP registration questions until later in the year. The data used to generate the harvest estimates still come from the HIP derived Questionnaire and Parts Surveys.

During 1998-2001, Post Office and HIP sampling were conducted to determine the effect of the improved sampling frame (HIP) on harvest estimates. After allowing a couple of years for each state to develop and refine its HIP system, estimates from the two sampling methods were compared (Table 1.)

Many biologists assumed that whatever biases existed in the waterfowl harvest data from the Post Office survey’s restricted pool of potential participants would be consistent for all states, but that was not the case during the 2001-2002 season. Highlighted are the three highest-

kill states in the flyway to illustrate the differences. In Louisiana, estimates of active hunters and ducks harvested were far lower for HIP than for the Post Office survey, but in Arkansas both were higher for HIP. In Minnesota, HIP estimated higher harvest but lower numbers of hunters. For the flyway as a whole, the harvest estimate was almost exactly the same, but estimates of active hunters were lower with HIP. Further comparisons are not possible because the Post Office survey was discontinued after the 2001-2002 season. Although harvest estimates for the flyway may be comparable, this suggests that Post Office and HIP estimates should be considered separately.

The advantages of HIP for getting an adequate, efficient, representative sample for estimating harvest of waterfowl are obvious, but there are other benefits. HIP allows better separation of resident and non-resident harvest without separate surveys. It improves the harvest estimates for other migratory birds, which, until HIP, were piggy-backed on the waterfowl harvest survey. Thus, those estimates were for the harvest of a species by duck hunters. Hunters that hunted other migratory birds, but not ducks, were not included in the sampling and data collection. HIP also provides a convenient database for states to select samples of migratory bird hunters for other work, such as recent hunter-opinion surveys. Lastly, HIP strengthens our confidence in using harvest data to justify opening hunting seasons and make future harvest management decisions.





# SOUTHEASTERN DEER STUDY GROUP: 32ND ANNUAL MEETING

*By Emile P. LeBlanc, DMAP Coordinator*

The Southeastern Deer Study Group is comprised of biologists, managers and researchers interested in white-tailed deer from 16 southern and southeastern states. This year's meeting of the SE Deer Study Group was held in Roanoke, Virginia. The theme of the meeting was "Herds Without Hunters: The Future of Deer Management?" Thirty-seven presentations were made, including 18 from university students. The following are synopses of presentations that had some relevance to hunting and managing deer in Louisiana.

## **1. David C. Guynn Jr. - *Herds without Hunters: The Future of Deer Management***

Societal change and declining hunter numbers paint a not so rosy picture of hunting's future. About 10 percent of the people in the United States are hunters. People are living in more urbanized areas and single parent households are more common. There are also changing ethnicity and culture. Caucasians exhibit the highest number of hunting related activities and are in decline. Hunter recruitment is suffering from age requirements, lack of mentors and lack of a general understanding of hunting. The primary tool for managing deer populations is antlerless harvest. Most of the country is comprised

of private lands (and harbor the majority of the deer population), which causes access problems for the general hunting public. Large-scale land development has caused fragmented land ownership and further decreased public access. These fragmented properties offer deer suitable habitat but hunter access to these properties is often problematic. Management policies will likely shift to deer problem resolution.

## **2. Mark Damian Duda - *The Public and Deer Management***

In 1943, Aldo Leopold stated that people management was more difficult than wildlife management and that statement remains true today. Even though hunting has changed and will continue to change, it has an overall public approval rating of 78 percent. Motivational approvals for hunting vary by a number of factors. Meat and human protection (deer vehicle collisions) reasons enjoy an 85 percent approval rating while trophy receives only a 28 percent public approval. Hunting approval also varies among species. Deer hunting receives a 78 percent approval followed closely by that of turkey hunting with a 75 percent approval rating. Black bear, mountain lion and mourning dove hunting follow with approval rates of 47, 42 and 40 percent, respectively.

As active hunters, we need to foster additional societal support for hunting.

Inactive hunters are typically older, urbanized and lack a support system. Five primary reasons for declining hunting participation are urbanization, aging society, fewer whites, loss of access and less opportunity.

## **Urbanization**

- makes rural land unavailable
- loss of rural people
- dilution of the hunting culture
- less free time and more structured time.

## **Inactive hunters**

- have less time to hunt
- more family and work obligations
- loss of interest

## **Recruitment and retention**

- 92 percent of hunters come from hunting families
- small game hunting initiates many, but deer hunting is important in many areas
- the future of hunting and shooting sports is in jeopardy.

## **3. Susan T. Guynn - *Recruitment of Women Hunters: An Opportunity for Growth***

Hunting is a male dominated sport. Currently, only 9 percent of all hunting licenses are held by women, but women comprise 50 percent of the population. Impediments to recruiting women into



hunting include lack of female mentors, opportunities and family-oriented hunting activities. The traditional role of females and associated peer pressure are also obstacles.

Even though women may have other family obligations, women as a group will take their children hunting more than men and communicate better with non-hunters than men. Women at Clemson University in South Carolina are offered a "Hunting Traditions Course" for credit in a female only setting. This approach to introducing women to hunting was developed because women tend to be intimidated by a coed setting when learning male dominated activities. It appears to be working as the class is increasing in popularity each semester.

**4. Jonathan M. Sleeman - *Incidence of Hemorrhagic Disease in Virginia is Associated with Winter and Summer Climatic Conditions***

EHD-2 is the most common strain of HD found in Virginia. The virus is transmitted by a biting midge (gnat). Deer can die within 24 hours after becoming symptomatic. HD symptoms include cracked, splitting or sloughing hooves. The magnitude of HD deaths is likely a minimum estimate due to the secretive nature of deer, and many that die go unnoticed. It is found to be more common along the coastal habitats and less prevalent westward.

HD was found to be positively correlated to average winter, early summer and late summer/fall temperatures. Low precipitation in June also increased the likelihood of HD outbreaks. It is believed that these combinations increase over-winter survival of the midge and enhance its breeding habitat. It is speculated that epidemiology for the acute and chronic forms is different.

**5. Justin W. Thayer - *Population Characteristics of White-tailed Deer in a Bottomland Hardwood Forest of South-central Louisiana***

Forty-eight (37 male and 11 female) deer were radiocollared and an additional 17 were ear-tagged in West Baton and Iberville parishes in 2007 and 2008. Adult male survival was 53 percent. Mean annual mortality from harvest (40 percent) was greater than for non-harvest (16 percent). Juvenile bucks (1½-years old) had a harvest rate of about 20 percent. Mean adult males' home ranges were 390 acres, 180 acres and 300 acres for the spring, summer and fall/winter periods, respectively. Females exhibited much smaller home ranges. They

were 170 acres, 135 acres and 65 acres for the same three periods, respectively. Dispersal was assessed for five 1½-year old males during the late winter and early spring. Dispersal distances ranged from 2.5 - 8.5 miles.

**6. Stephen L. Webb - *Measuring Fine-scale White-tailed Deer Movements and Environmental Influences Using GPS Collars***

GPS radio-collars were used to monitor fine-scale movement on 32 (17 female and 15 male) white-tailed deer in Oklahoma. Position locations were recorded every 15 minutes for 24 hours a day and compared to reproductive phase, moon phase and short-time weather patterns. Deer movement was greatest near sunrise and/or sunset, but varied by sex and time of year. Females moved most during the late winter/early spring (prior to parturition). Bucks moved most during the rut. Moon phase had no effect on total daily, nocturnal or daytime movements. Female movements were 305 percent greater when relative humidity was above normal compared to below normal (~1,500 yds vs ~500 yds).

**7. Kelley L. Flaherty - *Changes in Forest Understory Communities Following White-tailed Deer Exclusion***

Deer can have a significant negative impact on plant communities, particularly when at high densities. Plant community response to exclusion of white-tailed deer was documented in 19 1/40 acre exclosures and nearby controls at randomly located sites across West Virginia. Plots were monitored the first year of the study and every three years thereafter. Although controls and exclosures characteristics were similar at the start of the study and year three, significant differences in understory and ground cover were detected after six years and through 18 years. During this period, plant diversity increased within exclosures, suggesting changes were not because of a single species response. This study provides a potential time-table for understory recovery.

**8. M. Andy Pedersen - *Wounding Rates of White-tailed Deer with Modern Archery Equipment***

This study was conducted 30 miles south of Washington D.C. from 1989-2006.

All archers (bow and crossbow) were required to complete the IBEP Course followed by an annual proficiency test. Accuracy rates were 89 percent and 92

percent for compound bows and crossbows, respectively. "Wounded" was classified as an animal that was hit but not recovered, and data were reported by hunters. During these hunts, the wounding rate was 18 percent with no difference detected between compound bows and crossbows. People who had killed more than 20 deer had lower wounding rates than those who had killed less than 20 deer. Wounding rates in this study are similar to those reported in the 1990s and early 2000s. It was recommended that wounding rate should not be added to harvest rate because others studies suggest only about 1/3 of the deer wounded and not recovered die.

**9. John C. Kilgo - *Impact of Coyotes on Fawn Survival in South Carolina***

White-tailed deer populations are decreasing in many areas of South Carolina. In many of these same areas, coyotes are increasing. Coyotes are not native to South Carolina and may be a new and important mortality source to deer in these areas. A three-year study was initiated to determine the impact of a coyote population on fawn survival.

Pregnant does were captured and fitted with vaginal transmitters to facilitate capture of newborn fawns. Subsequently, 60 fawns were captured and radiocollared. Cause-specific mortality of fawns was determined from evidence collected on site. For example, coyotes typically bury fawns, but bobcats hide the carcass under brush. Average survival of the fawns was 25 percent. Mortality was highest in the first five to six weeks of life with 35 percent occurring within the first week. Coyotes were determined to be the primary cause of death (65-85 percent). Thirteen different coyotes were determined to be responsible for 15 kills where sufficient coyote DNA evidence could be collected. This suggests that mortality on the area was not due to a rogue coyote focusing on fawns.

The area has a low deer population (eight to 15 deer/sq. mi) with an equal sex ratio. The mortality due to predation, in addition to hunting mortality, is sufficient to explain the decreasing deer population. Management options discussed include doing nothing to reducing the hunting harvest of does by greater than 50 percent. Controlling the coyote population is also an option but, as with many other game species, being able to control predator populations on a landscape level is likely not practical.





# HABITAT IS THE POINT



*Native forbs and wildflowers create excellent brood-rearing habitat for quail and turkey. (primarily purple coneflower and partridge pea pictured here).*



*Good interspersed of aquatic plants and emergent marsh plants.*



[continued from 5] spring flooding along major river systems in 2008. The duration of this population decline will be determined by water levels over the next two years. Back to back flood events will lead to further declines in turkey numbers, while low spring waters can promote a rapid population recovery to normal levels.

**2. Chronic long-term population declines due to loss of habitat quality and turkey carrying capacity.** A long-term increase in intensive land-use activities can cause a subtle but irreversible loss of turkey habitat quality. Three intensive land use activities that have impacted large areas of the state's turkey habitat are deforestation for agricultural purposes, intensive pine monoculture management practices and residential development. Chronically low turkey recruitment in the Florida Parishes over the last 15 years is thought to be related to intensive land use practices. From a turkey habitat standpoint, Hurricane Katrina caused a short-term (10 year) loss of forest overstory and residential development caused a devastating long-term loss from the redistribution of the human population to higher ground. A small-scale example of the irreversible loss of turkey habitat is the replacement of a dairy farm with a subdivision.

**3. A chronic population decline that follows the rapid population boom exhibited by turkey populations in recently restocked areas.** This is a common phenomenon where wild turkeys are released into excellent, but previously unoccupied, habitat. They exhibit high reproductive success and rapidly develop





Kevin Cole

a high density population that expands to occupy available habitat. This boom is eventually followed by a period of population decline as recruitment declines under increasing pressure from disease, predators and other mortality factors. Typically, the population levels off at a moderate density below peak numbers as long as habitat conditions remain stable. This is a natural population cycle that follows its own timetable. Local areas of the northwest and western piney woods habitat regions may be exhibiting this population boom/decline cycle. Recently leased and posted hunting club lands bolstered protection for turkey restocking efforts in the late 1980s and early 1990s. As turkey populations expanded and hunting seasons were opened, a growing number of new turkey hunters saw good population levels and experienced high quality hunting. Some of these areas may now be seeing this natural boom/decline in combination with long-term declines from intensive land-use activity.

Most turkey hunters are happy with the quality of their hunting experience if they hear gobblers on a regular basis, have a reasonable opportunity to kill a gobbler and contact with other hunters is limited. While the overall quality of the turkey hunting experience is impacted by several important factors, turkey abundance is one of the most important. For a variety of reasons, turkey populations have recently seen a chronic downward trend in parts of Louisiana. Habitat quality is the best buffer against long-term turkey declines. Areas of the state that have stable high-quality habitat should recover from the current trend of short-term population declines.



**Biologist aging wings at the 2009 Mourning Dove Wing Bee**

*[continued from 9]* 2005. After the hunting season, biologists from state agencies and the USFWS meet at a central location to determine age for about 50,000 wings submitted by hunters.

Aging mourning doves is fairly straight forward until the feather molt reaches the eighth primary. At this point, it is often impossible to distinguish an adult bird from a juvenile bird. An aspect of the pilot banding project included a study to mathematically model the proportions of unknown aged wings which should be juveniles and adults. It required that the wing molt of captured birds be recorded in addition to the banding of the birds. This modeling process allows the inclusion of a significant number of wings that otherwise could not be used for the production estimate since many doves are molting the eighth, ninth or 10th primary by the opening day of the September dove season.

Harvest data are extremely important to the modeling process. Historically, USFWS did not monitor the dove harvest except through the duck stamp program. Unfortunately, this only provided the number of doves killed by duck hunters. Today everyone who hunts migratory game birds (ducks, doves, woodcock, snipe, etc.) must participate in HIP. When buying your hunting license, this is the free, but mandatory, permit that you get when you indicate that you intend to hunt migratory birds. The salesperson should ask you what your harvest of the various species was the prior year. Many hunters mistakenly think that the answers provided are used to estimate the harvest and wonder why they are being asked a year after the season. This is not actually how

it works. Hunters are placed in different groups depending on their prior years' harvest. From these groups, hunters are randomly selected to participate in the current season's harvest survey.

#### **Where are we now?**

Until more years of data have been obtained on the critical components of the models, results are highly variable and thus not adequate for making management decisions. Dove managers hope that within the next five years these data will be sufficient to produce estimates with reasonable confidence intervals. Until then, an interim harvest management strategy has been adopted for mourning doves. This strategy also uses complicated models that take four indices for mourning doves (including population growth) to produce a single composite index which is used to develop recommendations.



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